

FOUR NEW CRAB SPIDERS FROM TAIWAN (ARANEAE, THOMISIDAE)

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ABSTRACT. Examination of some thomisid specimens collected from Taiwan, three species are newly recorded from this fauna: *Misumenops pseudovatus* (Schenkel 1936), *Phrynarachne ceylonica* (O.P.-Cambridge 1884), *Xysticus croceus* (Fox 1937). In addition, four new species are described: *Lysiteles digitatus*, *L. torsivus*, *Takachihoa onoi*, and *Tmarus lanyu*.

Keywords: Thomisidae, *Lysiteles*, *Takachihoa*, *Tmarus*, Taiwan

The Thomisidae is a large family comprising 164 genera and 2,042 species (Platnick 2005) and is distributed worldwide. This family is commonly called the crab spiders for the body is generally strong, slightly flattened and the legs are laterigrade. Members of this family are small to large (3–23 mm) species, which build no webs and capture small insects by lying in wait. They are usually found on trees, shrubs and grasses, especially on flowering plants, as well as in leaf litter and under stones on the ground (Foelix 1996).

Although some thomisid species have been previously recorded from Taiwan (Ono 1977, 1980, 1992; Chen 1996; Song & Zhu 1997), the fauna has not been fully studied. Only 12 Taiwanese species belonging to 10 genera have been previously recorded: *Alcimochthes limbatus* Simon 1885, *Diaea subdola* O.P.-Cambridge 1885, *Lysiteles amoenus* Ono 1980, *L. silvanus* Ono 1980, *Misumenops tricuspis* Fabricius 1775, *Oxytate striatipes* L. Koch 1878, *Runcinia albostrigata* Bösenberg & Strand 1906, *Takachihoa trunciformis* (Bösenberg & Strand 1906), *Thomisus labefactus*

Karsch 1881, *T. okinawensis* Strand 1907, *Tmarus taiwanus* Ono 1977 and *Xysticus chui* Ono 1992 (Ono 1977, 1980, 1992; Chen 1996; Song & Zhu 1997; Platnick 2005). Recently, we examined some thomisid specimens collected from Taiwan, and found that three species are new to this fauna: *Misumenops pseudovatus* (Schenkel 1936), *Phrynarachne ceylonica* (O.P.-Cambridge 1884) and *Xysticus croceus* Fox 1937. Another four species are new to science and described here under the names of *Lysiteles digitatus*, *L. torsivus*, *Takachihoa onoi* and *Tmarus lanyu*.

METHODS

Type specimens are deposited in the National Museum of Natural Science, Taichung, Taiwan (NMNS). All measurements given are in mm. Palp measurements are shown as: total length (femur, patella, tibia, tarsus). Leg measurements are shown as: total length (femur, patella and tibia, metatarsus, tarsus). Abbreviations used in this study are: AME = anterior median eye; ALE = anterior lateral eye; PME = posterior median eye; PLE = posterior lateral eye; MOA = median ocular area.

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SYSTEMATICS

Family Thomisidae Sundevall 1833

Key to genera from Taiwan

1. Chelicerae with strong teeth on both margins of fang furrow; body with granulations and tubercles on dorsum *Phrynarachne*
Chelicerae lacking teeth; body otherwise 2
2. Tarsi with claw tufts formed by tenent hairs 3
Tarsi lacking claw tufts or with undeveloped tufts formed by simple hairs 4
3. Eye area wide, almost as wide as cephalothorax; retrolateral tibial apophysis of male palp not much developed; female epigynum with only one guide pocket *Alcimochthes*
Eye area narrow, only half as wide as cephalothorax; retrolateral tibial apophysis of male palp much developed; female epigynum with a pair of guide pocket *Oxytate*
4. Clypeus wide; tubercles of PLE larger than those of ALE *Tmarus*
Clypeus narrow; tubercles of PLE smaller than those of ALE 5
5. Body and legs somber-colored, yellowish to blackish brown; leg I only a little longer than leg IV; inhabiting ground and low herbs *Xysticus*
Body and legs bright-colored, white, yellow, green or light brown; leg I much longer than leg IV; inhabiting plants 6
6. Cephalothorax with long thoracic setae; retrolateral tibial apophysis of male palp simple and sclerotized; body and legs relatively somber 7
Thoracic setae usually short or lacking; retrolateral tibial apophysis of male palp much developed and basally not sclerotized; body and legs usually green-colored 8
7. Female abdomen longer than wide; embolus of male palp short and thick; spermathecae of female epigynum large *Lysiteles*
Female abdomen as wide as or wider than long; embolus of male palp long and filiform; spermathecae of female epigynum small *Takachioa*
8. Conical protuberance present between ALE and PLE; male much smaller than female .. 9
Conical protuberance absent between ALE and PLE; male not much smaller than female 10
9. Abdomen as wide as or wider than long; protuberance between ALE and PLE well-developed *Thomisus*
Abdomen much longer than wide; protuberance between ALE and PLE small *Runcinia*
10. MOA longer than wide; embolic division of male palp winding around tegulum; epigynum with soft protuberance *Diaea*
MOA wider than long; embolic division of male palp winding around tegulum or very short with basal structure; epigynum rarely with undeveloped protuberance *Misumenops*

Genus *Lysiteles* Simon 1895

Lysiteles Simon 1895:998; Ono 1988:132; Song & Zhu 1997:119.

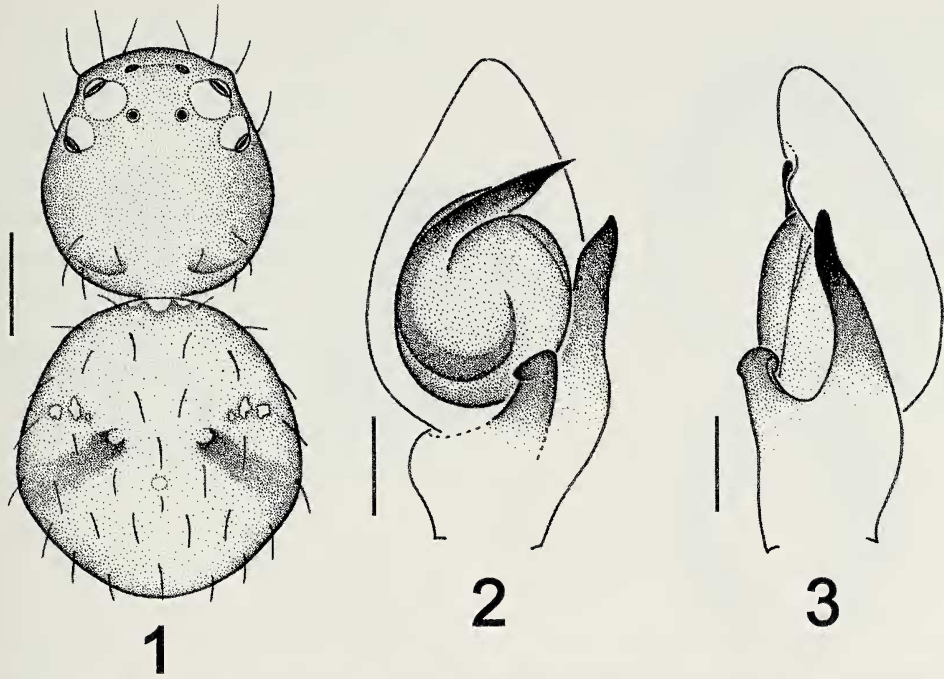
Type species.—*Lysiteles catulus* Simon 1895, by original designation.

Diagnosis.—Small thomisids with well developed eyes. Male palp with ventral and retrolateral tibial apophyses; retrolateral tibial apophysis strongly sclerotized; palpal bulb without apophyses; embolus short, thick and twisted. Female epigynum with a sclerotized fold, with intromittent orifice situated in the fold; spermathecae globular (Ono 1988).

Remarks.—This genus is represented by 38 species distributed in Bhutan, China, Nepal, Philippines, India, Russia, Korea and Japan (Platnick 2005). Among them, two species, *Lysiteles amoenus* Ono 1980 and *L. silvanus* Ono 1980, are currently reported from Taiwan.

Lysiteles digitatus new species
Figs. 1–3

Type material.—Male holotype, Lanyu (22°02'N, 121°33'E), Taitung County, Taiwan, February 2001, K.C. Chen (NMNS-THU-Ar-02-0302); 1 male paratype, Taitung County,



Figures 1-3.—*Lysiteles digitatus* new species: 1. Male, dorsal view; 2. Left palp, ventral view; 3. Left palp, retrolateral view. Scale lines: 0.5 mm (Fig. 1); 0.1 mm (Figs. 2, 3).

Taiwan, August 2000, K.C. Chen (NMNS-THU-Ar-02-0301).

Etymology.—The specific name is from the Latin “digitatus”, and refers to the finger-like distal part of the retrolateral tibial apophysis of the male palp.

Diagnosis.—This species resembles *L. maius* Ono 1979 (Ono 1979, 1980), but differs from the latter in that the abdomen lacks large dark patches, the embolus is long, with its tip dagger-like, and the retrolateral tibial apophysis of male palp is almost three times as long as the ventral tibial apophysis (Figs. 2, 3); whereas in *L. maius*, the dorsum of male abdomen has large dark patches, a short embolus, and the retrolateral tibial apophysis is only slightly longer than the ventral tibial apophysis.

Male.—Total length 1.70–2.65. Holotype total length 2.65; cephalothorax 1.33 long, 1.09 wide; abdomen 1.36 long, 1.21 wide. Carapace orange, with some long setae (Fig. 1). Chelicerae, endites, labium, sternum and legs orange. Legs with a few long spines and fine hairs. Abdomen earthy yellow, with a few small white spots and 2 brown patches, scattered with some long setae. Both eye rows recurved. AME-AME: AME-ALE (0.14:

0.09), PME-PME: PME-PLE (0.17: 0.27); AME: ALE: PME: PLE (0.08: 0.14: 0.05: 0.12). MOA 0.29 long, front width 0.31, back width 0.29. Clypeus width 0.21. Labium longer than wide (0.22: 0.16). Sternum longer than wide (0.65: 0.60). Measurements of palp and legs: palp 0.97 (0.22, 0.16, 0.13, 0.46); leg I 3.88 (1.31, 1.50, 0.65, 0.42), II 4.41 (1.36, 1.58, 0.87, 0.60), III 2.59 (0.78, 0.94, 0.46, 0.41), IV 2.72 (0.88, 0.99, 0.44, 0.41). Leg formula: 2, 1, 4, 3. Palpal bulb simple; embolus short, tip pointed in ventral view; ventral tibial apophysis short, apically with a blunt hook; retrolateral tibial apophysis long, with its distal part finger-like (Figs. 2, 3).

Female.—Unknown.

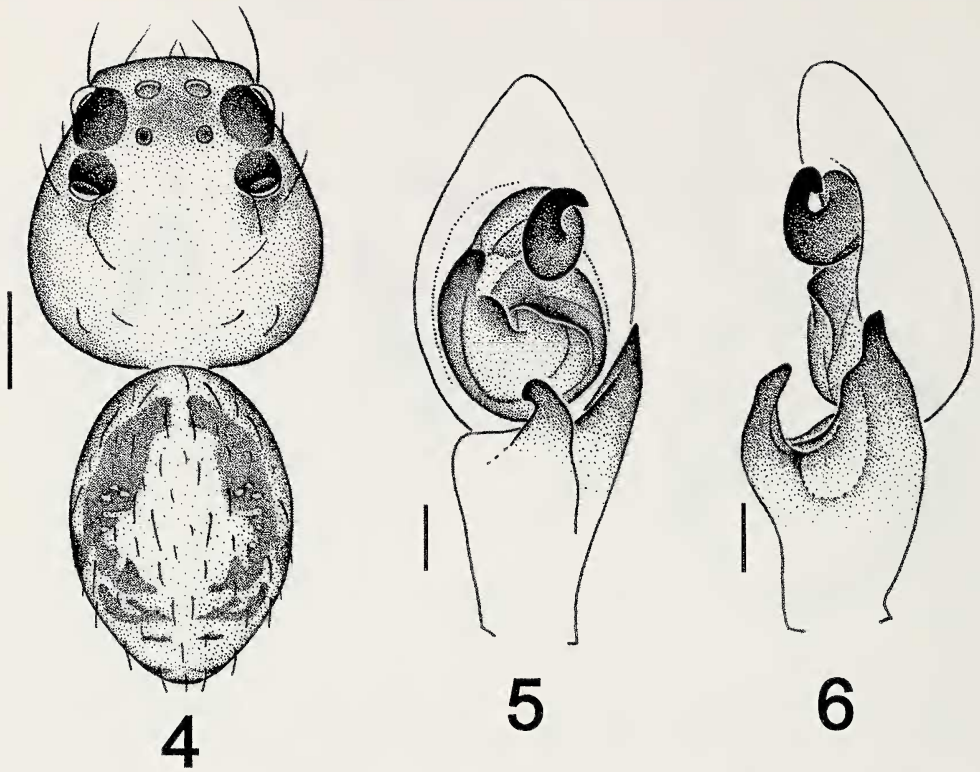
Distribution.—This species is only known from Taitung County, Taiwan.

Lysiteles torsivus new species

Figs. 4–6

Type material.—Male holotype, Lanyu (22°02'N, 121°33'E), Taitung County, Taiwan, February 2001, K.C. Chen (NMNS-THU-Ar-02-0316).

Etymology.—The specific name is from the Latin “torsivus”, and refers to the curved embolus of the male palp.



Figures 4-6.—*Lysiteles torsivus* new species: 4. Male, dorsal view; 5. Left palp, ventral view; 6. Left palp, retrolateral view. Scale lines: 0.5 mm (Fig. 4); 0.1 mm (Figs. 5, 6).

Diagnosis.—This species is identified as new rather than the male of *Lysiteles amoenus* (Ono 1980) from Taiwan, because the carapace is trapeziform, and the posterior eye row is longer than the anterior row (Fig. 4); whereas in *L. amoenus*, the carapace is almost quadrate, and the posterior eye row is narrower than the anterior row. The new species is also similar to *L. silvanus* Ono 1980, but can be easily distinguished from the latter by the short and thick embolus of the male palp, which is curved in the opposite direction, and the retrolateral apophysis is dagger-shaped in ventral view (Figs. 5, 6).

Male.—Holotype total length 3.15; cephalothorax 1.53 long, 1.41 wide; abdomen 1.76 long, 1.19 wide. Carapace orange, with some long setae, eye region deep brown (Fig. 4). Chelicerae orange, outer lateral margin of front surface deep brown. Endites, labium and sternum yellow. Sternum with many long setae. Legs yellow, distal end of tibiae and tarsi orange. Legs with many spines and setae, tibiae I and II with 2 pairs of ventral spines, metatarsi I and II with 3 pairs of ventral

spines. Abdomen yellow, with some long and short setae; dorsum with gray brown patches and a few small yellowish spots; venter with lateral longitudinal gray brown markings in posterior half. Both eye rows recurved. AME-AME: AME-ALE (0.12: 0.13), PME-PME: PME-PLA (0.16: 0.31); AME: ALE: PME: PLA (0.14: 0.21: 0.12: 0.117. MOA 0.29 long, front width 0.38, back width 0.35. Clypeus width 0.26. Labium longer than wide (0.39: 0.26). Sternum wider than long (0.85: 0.82). Measurements of palp and legs: palp 1.71 (0.66, 0.30, 0.23, 0.52); leg I 5.90 (1.80, 2.07, 1.35, 0.68), II 6.26 (1.89, 2.30, 1.35, 0.72), III 3.78 (1.26, 1.35, 0.72, 0.45), IV 3.83 (1.17, 1.35, 0.81, 0.50). Leg formula: 2, 1, 4, 3. Palpal bulb simple; embolus thick and curved; ventral tibial apophysis short and apically hooked; retrolateral tibial apophysis long, dagger-shaped as seen in ventral view (Figs. 5, 6).

Female.—Unknown.

Distribution.—This species is only known from Taitung County, Taiwan.

Genus *Misumenops* F.O.P.-Cambridge
1900

Misumenops F.O.P.-Cambridge 1900:134; Ono 1988:156; Song & Zhu 1997:136.

Type species.—*Misumena maculis-parsa* Keyserling 1891, by original designation.

Diagnosis.—Small to medium-sized thomisids. Tubercles of lateral eyes connate, lateral eyes much larger than median eyes. Male palp with retrolateral, ventral and intermediate tibial apophyses, ventral tibial apophysis digitiform and retrolateral tibial apophysis frequently with dorsal tooth. Female epigynum with central hood, intromittent orifices situated at both sides of hood, spermathecae usually small and tubular (Ono 1988).

Remarks.—Some 123 species and three subspecies of *Misumenops* have been reported worldwide, which are distributed in America and Asia (Platnick 2005). Only one species, *Misumenops tricuspoidatus* (Fabricius 1775), was previously recorded from Taiwan.

Misumenops pseudovatus (Schenkel 1936)

Misumena pseudovatia Schenkel 1936:132, fig. 48.
Misumenops pseudovatus (Schenkel): Song & Zhu 1997:141, fig. 101, figs. 101A-D; Song, Zhu & Chen 1999:483, figs. 279C, K.

Material examined.—TAIWAN: *Taitung County*: 1 ♂, Lanyu (22°02'N, 121°33'E), August 2000, K.C. Chen (NMNS-THU-Ar-02-0303); 1 ♂, Lanyu (22°02'N, 121°33'E), August 2000, K.C. Chen (NMNS-THU-Ar-02-0304); 1 ♂, Taichung City (24°11'N, 120°35'E), 1 May 2000, J.N. Hwang.

Diagnosis.—This species resembles *Misumenops tricuspoidatus* (Fabricius 1775) (Song & Zhu 1997) in the coloration and body shape, but can be easily distinguished from the latter by the central hood of the female epigynum, the large and almost rectangular spermathecae; the very small ventral tibial apophysis of male palp, and the presence of a dorsal tooth on the retrolateral tibial apophysis.

Female.—See descriptions and illustrations of Song & Zhu (1997).

Male.—See descriptions and illustrations of Song & Zhu (1997).

Distribution.—China and neighboring islands; Bhutan.

Genus *Phrynarachne* Thorell 1869

Phrynarachne Thorell 1869:37; Ono 1988:23; Song & Zhu 1997:25.

Type species.—*Thomisus rugosus* Walckenaer 1805, by original designation.

Diagnosis.—Medium to large-sized thomisids. Eyes small, subequal in size. Cephalothorax with granulations, abdomen with many tubercles. Retrolateral tibial apophysis of male palp spiniform and long, palpal bulb simple, embolus filiform and winding around tegulum. Female epigynum with a sclerotized plate; spermathecae reniform (Ono 1988).

Remarks.—Members of the genus *Phrynarachne* have been mainly reported from Asia and Africa, and 28 species and two subspecies have been reported (Platnick 2005). This genus is new to Taiwan.

Phrynarachne ceylonica
(O.P.-Cambridge 1884)

Ornithoscatoides ceylonica O.P.-Cambridge 1884: 201, plate 15, fig. 3.

Phrynarachne ceylonica (O.P.-Cambridge): Thorell 1891:97; Ono 1988:25, figs. 11–17

Material examined.—TAIWAN: *Taitung County*: 1 ♀, Lanyu (22°02'N, 121°33'E), August 2000, S.Y. Du (NMNS-THU-Ar-01-0031); *Pingtung County*: 1 ♀, Nan-Jen Shan (22°05'N, 120°50'E), March 1999, Y. Y. Chen (NMNS-THU-Ar-01-0032).

Diagnosis.—This species is similar to *Phrynarachne katoi* Tikuni 1955 (see Ono 1988) in body shape and coloration, but can be easily distinguished from the latter in that the epigynum has no central hood under the epigynal plate, the spermathecae have anteriorly situated glands, the ventral tibial apophysis of male palp is curved distally and the cymbium is expanded retrolaterally.

Female.—See descriptions and illustrations of Ono (1988).

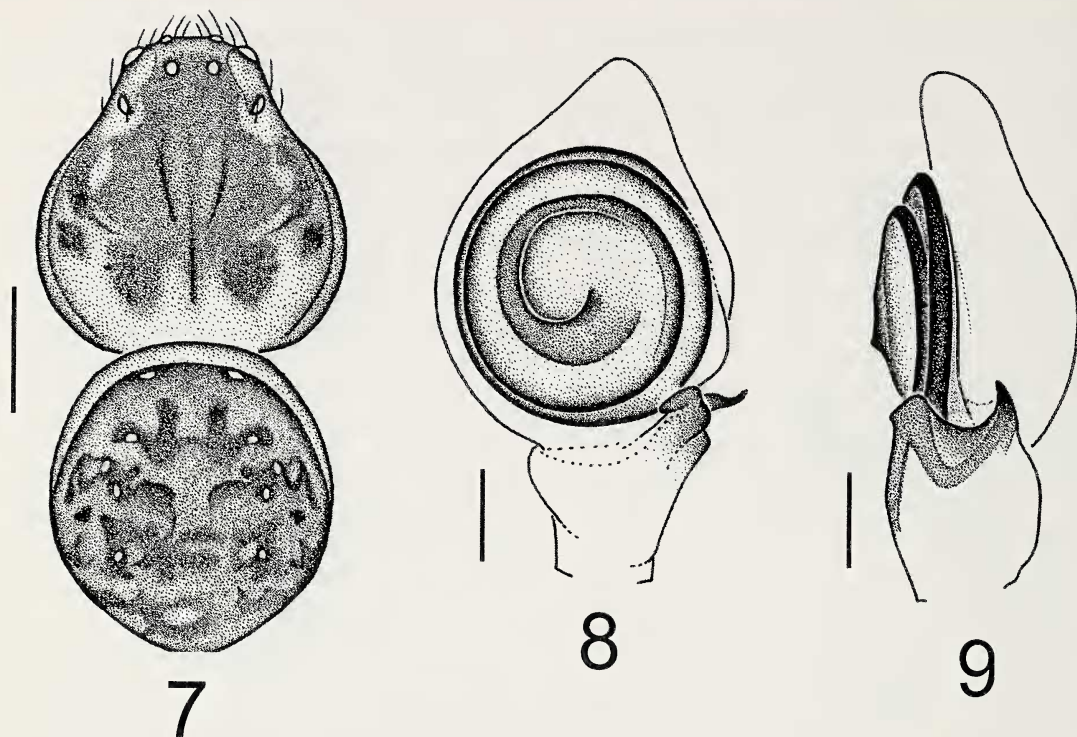
Male.—See descriptions and illustrations of Ono (1988).

Distribution.—China and neighboring islands; Japan; Sumatra; Nicobar Islands; India; Sri Lanka.

Genus *Takachihoa* Ono 1985

Takachihoa Ono 1985:28; Ono 1988:152; Song & Zhu 1997:135.

Type species.—*Oxyptila trunciformis* Bösenberg & Strand 1906, by monotypy.



Figures 7-9.—*Takachioha onoi* new species: 7. Male, dorsal view; 8. Left palp, ventral view; 9. Left palp, retrolateral view. Scale lines: 0.5 mm (Fig. 7); 0.1 mm (Figs 8, 9).

Diagnosis.—Small thomisids. Cephalothorax with clavate setae in females. Male palp with ventral and retrolateral tibial apophyses, palpal bulb without apophyses, embolus long and filiform, winding twice around the tegulum. Female epigynum is weakly sclerotized, with a median hood, and small, globular spermathecae. *Takachioha* is similar to *Synaema* Simon 1864, but differs from the latter in that the female epigynum is weakly sclerotized and bears no chitinized plates, and the ventral tibial apophysis of male palp is large and securiform (Ono 1988).

Remarks.—Two species of *Takachioha* have been previously named from China, Japan and Indonesia (Platnick 2005), and we here add a third species from Taiwan.

Takachioha onoi new species

Figs. 7-9

Type material.—Male holotype, Lanyu (22°02'N, 121°33'E), Taitung County, Taiwan, August 2000, K.C. Chen (NMNS-THU-Ar-02-0308); 1 male paratype, Lanyu (22°02'N, 121°33'E), Taitung County, Taiwan, February 2001, K.C. Chen (NMNS-THU-Ar-02-0309).

Etymology.—The specific name is a patronym in honor of the well-known Japanese araneologist, Dr H. Ono.

Diagnosis.—The new species resembles *Takachioha truciformis* (Bösenberg & Strand 1906) (see Ono 1988) in the shape of the male palp, but differs from the latter in that the ventral tibial apophysis is axe-shaped in ventral view and the retrolateral tibial apophysis is not bifurcated in lateral view (Figs. 8, 9).

Male.—Total length 2.43–2.45. Holotype total length 2.45; cephalothorax 1.24 long, 1.34 wide; abdomen 1.29 long, 1.19 wide. Carapace red brown, with black brown patches and several setae. Chelicerae yellow brown, with gray brown pigment on front surface. Endites yellow brown, lateral margins gray brown. Labium reddish brown, distal part pale. Sternum yellow brown. Legs I and II red brown, with gray brown spots on femora; basal parts of coxae, trochanters and femora of legs III and IV yellowish brown, rest red brown. Tibiae I and II with 4 pairs of ventral spines, metatarsi I and II with 3 pairs of ventral spines. Dorsum of abdomen yellow brown, scattered with irregular black brown

patches, anterior margin yellowish brown; venter earthy yellow, with 2 grayish brown patches in front of spinnerets. Both eye rows recurved. AME-AME: AME-ALE (0.12: 0.08), PME-PME: PME-PLE (0.10: 0.22); AME: ALE: PME: PLE (0.05: 0.12: 0.04: 0.07). MOA 0.18 long, front width 0.23, back width 0.22. Clypeus width 0.08. Labium slightly wider than long (0.20: 0.19). Sternum longer than wide (0.68: 0.65). Measurements of palp and legs: palp 1.08 (0.38, 0.21, 0.13, 0.36); leg I 4.00 (1.16, 1.38, 0.88, 0.58), II 5.30 (1.48, 1.87, 1.39, 0.56), III 2.75 (0.90, 1.02, 0.46, 0.37), IV 2.69 (0.85, 0.99, 0.48, 0.37). Leg formula: 2, 1, 3, 4. Palpal bulb simple, without apophyses; embolus long and filiform, winding around tegulum in two circles; ventral tibial apophysis large and axe-shaped in ventral view; retrolateral tibial apophysis not well developed with its distal end single, not bifurcated (Figs. 8, 9).

Female.—Unknown.

Distribution.—This species is only known from Taitung County, Taiwan.

Genus *Tmarus* Simon 1875

Tmarus Simon 1875:259; Ono 1988:53; Song & Zhu 1997:44.

Type species.—*Aranea pigra* Walckenaer 1802, by original designation.

Diagnosis.—Medium-sized thomisids. MOA nearly as long as wide. Male palp with ventral and retrolateral tibial apophyses, frequently with intermediate and distal tibial apophyses, palpal bulb is simple, lacking apophyses, embolus usually short and thick. Female epigynum usually with a median hood, spermathecae small, globular, oval or reniform (Ono 1988).

Remarks.—Although some 210 species are currently included in the genus *Tmarus* (Platnick 2005), only *T. taiwanus* Ono 1977 was previously recorded from Taiwan. We here report on a new Taiwanese species.

Tmarus lanyu new species

Figs. 10–14

Type material.—Female holotype, Lanyu (22°02'N, 121°33'E), Taitung County, Taiwan, 19 February 1997 (NMNS-THU-Ar-01-0035). Paratypes, all from Lanyu (22°02'N, 121°33'E), Taitung County, Taiwan: 1 female, 18 February 1997 (NMNS-THU-Ar-01-0044); 1 male, 17 February 1997, I-Min Tso (NMNS-

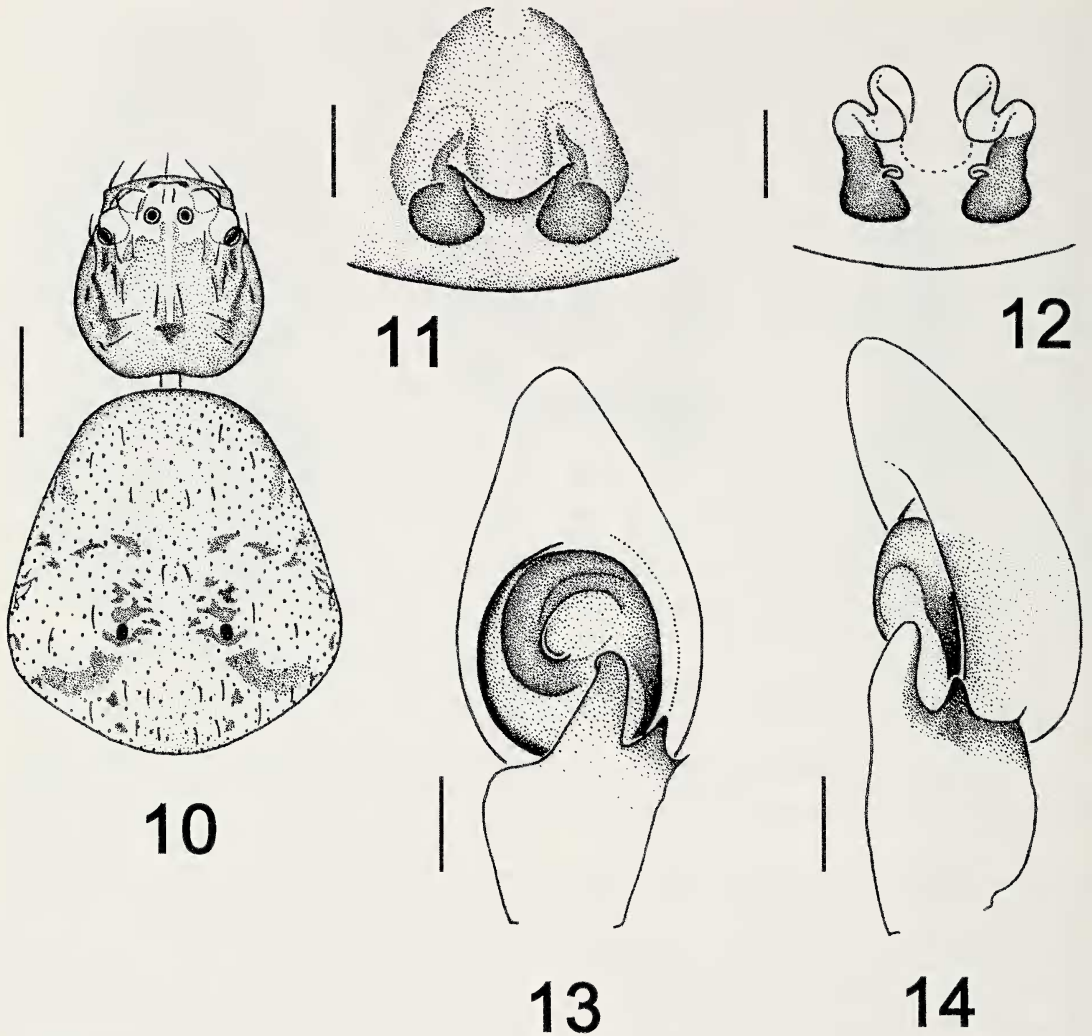
THU-Ar-01-0042); 2 females and 2 males, February 2001, K.C. Chen (NMNS-THU-Ar-02-0296~0297, 0299~0300); 1 female, August 2001, K.C. Chen (NMNS-THU-Ar-02-0295); 1 male, August 2000, K.C. Chen (NMNS-THU-Ar-02-0298).

Etymology.—The specific name is a noun in apposition taken from the type locality.

Diagnosis.—The new species resembles *Tmarus komi* Ono 1996 in the shape of the male palp but differs from the latter in having a palpal bulb longer than wide, a small and distal retrolateral tibial apophysis, and a spinous tibial apophysis (Figs. 13, 14); whereas in *T. komi*, the palpal bulb is wider than long, the retrolateral tibial apophysis is wide and with a dorsal tooth. The new species is also similar to *T. taiwanus* Ono 1977 but can be distinguished from the latter by the epigynum with a median hood and the connecting duct long and curved (Figs. 11, 12).

Female.—Total length 5.13–5.18. Holotype total length 5.13; cephalothorax 1.71 long, 1.62 wide; abdomen 3.33 long, 2.88 wide. Carapace orange, with some black brown patches and a few long setae; eye region white, with some fine setae. Chelicerae orange, blackish brown on anterior lateral surface, with white spots on front surface; both promargin and retromargin lacking teeth. Labium blackish brown with basal part paler. Palps, endites, sternum and legs yellow. Legs with some spines and setae. Abdomen white, with numerous brown speckles; dorsum scattered with a few brown patches and a pair of red brown spots; venter with a wide longitudinal yellow brown band behind the genital groove. Both eye rows recurved. AME-AME: AME-ALE (0.14: 0.13), PME-PME: PME-PLE (0.16: 0.35); AME: ALE: PME: PLE (0.10: 0.22: 0.10: 0.21). MOA 0.47 long, front width 0.33, back width 0.42. Clypeus width 0.20. Labium longer than wide (0.44: 0.23). Sternum longer than wide (0.91: 0.75). Measurements of legs: I 5.59 (1.76, 2.07, 1.11, 0.65), II 5.89 (1.89, 2.16, 1.19, 0.65), III 4.38 (1.43, 1.56, 0.85, 0.54, IV 4.64 (1.53, 1.58, 0.99, 0.54). Leg formula: 2, 1, 4, 3. Epigynum with a median hood, connecting ducts long and membranous, spermathecae almost reniform (Figs. 11–12).

Male.—Total length 2.97–3.33. Male total length 3.24; cephalothorax 1.43 long, 1.36 wide; abdomen 2.03 long, 1.24 wide. Abdo-



Figures 10–14.—*Tmarus lanyu* new species: 10. Female, dorsal view; 11. Epigynum; 12. Vulva; 13. Left palp of the male, ventral view; 14. Left palp of the male, retrolateral view. Scale lines: 1.0 mm (Fig. 10); 0.1 mm (Figs. 11–14).

men relatively longer and narrower. Other characters as in female holotype. Measurements of palp and legs: palp 1.43 (0.52, 0.29, 0.20, 0.42); leg I 6.26 (2.07, 2.16, 1.26, 0.77), II 6.26 (1.98, 2.25, 1.31, 0.72), III 4.46 (1.35, 1.62, 0.90, 0.59), IV 4.55 (1.53, 1.53, 0.90, 0.59). Leg formula: 1, 2, 4, 3. Palp with ventral, retrolateral and distal tibial apophyses; ventral apophysis digitiform, retrolateral apophysis small, and distal apophysis spinous; bulb longer than wide, embolus long and filiform (Figs. 13, 14).

Remarks.—The new species is closely related to *Tmarus komi* Ono 1996 from Japan. But as Ono mentioned in his paper, *T. komi* is

a peculiar member of *Tmarus* in having the legs without well-developed spines and the male palp with a simple bulb and long, filiform embolus (Ono 1996). Rather than creating a new genus for them, we have followed Ono (1996) and placed the new species temporarily in the genus *Tmarus* because many species of this genus from Southeast Asia still need to be studied.

Distribution.—This species is presently only known from Taitung County, Taiwan.

Genus *Xysticus* C.L. Koch 1835

Xysticus C.L. Koch 1835:16, 17; Ono 1988:77; Song & Zhu 1997:64.

Type species.—*Aranea audax* Schrank 1803, by original designation.

Diagnosis.—Medium-sized thomisids. Cephalothorax domed, not flattened; head wide with strong setae. Tubercles of ALE and PLE connate. Legs with developed spines. Male palp generally with ventral and retrolateral tibial apophyses, as well as intermedial tibial apophysis in some species-groups; palpal bulb tegulum sometimes has two or three apophyses. Female epigynum heavily sclerotized lacking guide pocket and frequently with median septum; spermathecae large, globular or reniform (Ono 1988).

Remarks.—Although 354 species and 12 subspecies are recorded in this genus (Platnick 2005), only *X. chui* Ono 1992 has been reported from Taiwan. We here report the first record of *X. croceus* Fox 1937 from Taiwan.

Xysticus croceus Fox 1937

Xysticus croceus Fox 1937:19, fig. 11; Ono 1988: 89, figs. 79–82; Song & Zhu 1997:77, figs. 47A–D; Song, Zhu & Chen 1999:501, figs. 285C, M.

Material examined.—TAIWAN: *Nantou County*: 1 ♂, Hui-Sun Forest Station (24°06'N, 121°03'E), 24 April 1999, I. C. Chou (NMNS-THU-Ar-01-0031).

Diagnosis.—This species resembles *Xysticus ephippiatus* Simon 1880 (Song & Zhu 1997) in body shape and coloration, but differs from the latter in that the anterior depression of the female epigynum is flat and its posterior margin strongly recurved, the smaller spermathecae, and the wider and longer retrolateral tibial apophysis of male palp.

Female.—See descriptions and illustrations of Song & Zhu (1997) and Ono (1988).

Male.—See descriptions and illustrations of Song & Zhu (1997) and Ono (1988).

Distribution.—*Xysticus croceus* occurs in China and its neighboring islands, as well as India, Nepal, Bhutan, Korea and Japan.

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LITERATURE CITED

Bösenberg, W. & E. Strand. 1906. Japanische Spinnen. Abhandlungen von der Senckenbergischen Naturforschenden Gesellschaft 30:93–422.

Cambridge, F.O.P. 1900. Arachnida—Araneida and Opiliones. In *Biologia Centrali-Americana, Zoology*. Vol. 2: 89–192. Taylor & Francis, London.

Cambridge, O.P. 1884. On two new genera of spiders. *Proceedings of the Zoological Society of London* 1884:196–205.

Chen, S.H. 1996. A checklist of spiders in Taiwan. *Annual of Taiwan Museum* 39:123–156.

Foelix, R. 1996. *Biology of Spiders*. Oxford. Oxford University Press.

Fox, I. 1937. Notes on Chinese spiders of the families Salticidae and Thomisidae. *Journal of the Washington Academy of Science* 27:12–23.

Koch, C.L. 1835. Spinnen. Arachniden. In Panzer, G.W.F., *Fauna Insectorum Germaniae initia*. Hefte 129:12–24.

Ono, H. 1977. Thomisidae aus Japan I. Das Genus *Tmarus* Simon (Arachnida: Araneae). *Acta Arachnologica*, Tokyo 27(Spec. No.):61–84.

Ono, H. 1979. Thomisidae aus dem Nepal-Himalaya. II. Das Genus *Lysiteles* Simon 1895 (Arachnida: Araneae). *Senckenbergiana Biologica* 60:91–108.

Ono, H. 1980. Thomisidae aus Japan III. Das Genus *Lysiteles* Simon 1895 (Arachnida: Araneae). *Senckenbergiana Biologica* 60:203–217.

Ono, H. 1985. Revision einiger Arten der Familie Thomisidae (Arachnida, Araneae) aus Japan. *Bulletin of the National Science Museum Tokyo (A)* 11:19–39.

Ono, H. 1988. A revisional study of the spider family Thomisidae (Arachnida, Araneae) of Japan. *National Science Museum, Tokyo*.

Ono, H. 1992. Occurrence of the genus *Xysticus* (Araneae, Thomisidae) in Taiwan. *Bulletin of the National Science Museum Tokyo (A)* 18:35–40.

Ono, H. 1996. Two new species of the families Liphistiidae and Thomisidae (Araneae) from the Ryukyu Islands, southwest Japan. *Acta Arachnologica*, Tokyo 45:157–162.

Platnick, N.I. 2005. *The World Spider Catalog, Version 5.5*. American Museum of Natural History, online at <http://research.amnh.org/entomology/spider/catalog81-87/index.html>

Schenkel, E. 1936. Kleine Beiträge zur Spinnenkunde. II. Teil. *Revue Suisse de Zoologie* 43: 307–333.

Simon, E. 1875. *Les Arachnides de France*. Librairie Encyclopédique de Roret, Paris. Vol. 2: 1–350.

Simon, E. 1895. *Histoire Naturelle des Araignées*. Encyclopédie Roret, Paris. Vol. 1: 761–1084.

Song, D.X. & M.S. Zhu. 1997. *Fauna Sinica: Arachnida: Araneae: Thomisidae, Philodromidae*. Science Press, Beijing.

Song, D.X., M.S. Zhu & J. Chen. 1999. *The Spiders of China*. Hebei Science and Technology Publishing House, Shijiazhuang.

Thorell, T. 1869. On European spiders. Part I. Review of the European genera of spiders, preceded

by some observations on zoological nomenclature. *Nova Acta Regiae Societatis Scientiarum Upsaliensis* (3) 7:1–108.

Thorell, T. 1891. Spindlar från Nikobarerna och andra delar af Södra Asien, etc. Kongliga Svenska

Vetenskaps-Akademeins. Handlingar 24(2):1–149.

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